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NOTES AND LITERATURE

NOTES ON EVOLUTION

THE retirement of Ernst Haeckel from his chair in the University of Jena is a punctuation mark—fortunately not a period—in the long and noble story of *"Haeckelismus in der Zoologie."* I am aware that the coining of this phrase by Karl Semper and the subsequent use of it by some zoologists and many theologists were not of the nature of compliment to the veteran fighting evolutionist of the Thüringian hills. The phrase was meant to connote reproach, but I prefer to see in it an unavoidable recognition of the great influence and importance of Haeckel's work in the history of biology and evolution. We may decry speculation in zoology and phylogeny in evolution, but without scientific imagination we do not go far forward in any science, and the principles of evolution studied without reference to their practise would leave bionomics far more "philosophical" and much less "biological" than we would have it. Even if Haeckel's speculations and vigorous championship of them had done no more than serve as a stimulus to others to work in order to fight them, they would have had their inestimable importance in evolutionary history. As a matter of fact many of the Haeckelian speculations of the early days are now the accepted and incorporated evolution commonplaces of the present day.

Haeckel gives up lecturing to the Jena students and peering over their shoulders at their dissections to devote himself especially to the building up and care of his new Phyletic Museum. He is now seventy-five years old, and for forty-five years has taught, investigated and written at Jena. Now he gives up part of this work to undertake something else in its stead. A glorious record! And one not uncommon in German scholastic life. Leuckart was lecturing vigorously every day in the week except Sunday up to within two weeks of his death at seventy-six, and the number of active and anything but superannuated professors in German universities beyond the Carnegie fund retiring age is suprisingly large.

The new Phyletic Museum at Jena has been established solely through Haeckel's personal activity and largely through his personal financial aid. He has given to it 30,000 M. of money and his private library and collections. The building, for which original gifts amounting to 100,000 M. were obtained is now finished and the gathering together and arrangement of collections are going on. It is hoped to have sufficient material on hand and arranged by next spring (1910) to justify the public opening. The building was formally taken over by the University of Jena last July (1908) on the occasion of the celebration of the 350th anniversary of the university's founding. The gathering of the collections and their maintenance must depend entirely in private gifts, and Haeckel makes an earnest appeal to all friends of the development theory for financial aid. Money may be sent to the *Rentamt der Universität Jena, Jenergasse 8, Jena.* Donors of sums of 10,000 M., or over, will have their names engraved on a tablet of *"Ewige Mitglieder des Phyletischen Senates"* placed in the entrance hall of the museum. Professor Haeckel writes in a recent letter that the total expense of establishing the museum will be about 200,000 M., of which 130,000 M. have so far been raised.

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In Germany there goes on a steady discussion of the *Vitalismus versus Mechanismus* subject. There is a constant running disputational conflict between the mechanicalists and the neo-vitalists. The latter find their champion in Hans Driesch, while among the former Otto zur Strassen is one of the most active: If Driesch were not so keen in his criticisms and so adroit in his argumentation victory would have been long ago with his antagonists, for he supports an impossible position. But he uses the method of offense and not of defense; he attacks the weak places in mechanicalism and constantly shifts the burden of proof to the shoulders of the mechanicalists. It is the method made famous, and for long successful, by Weismann, in his war on neo-Lamarckism. But Weismann had in the end, when his position was attacked, to make great concessions, and so it will be with Driesch. Neo-vitalism is really not new, despite its new terminology, but is simply paleo-vitalism very adroitly rehabilitated; and vitalism under any form is irreconcilable with the spirit of scientific progress.

A very interesting example of the advance of mechanicalism at the expense of vitalism on one hand and finalism on the other, is that of the attitude and work of Dr Pierre Janet, the brilliant Salpetriere student of nervous functions. In a recent book, "Les Nevroses," and more especially in a course of lectures now being given in the Collège de France on the expression and influences of the emotions and sentiments, Janet discards almost entirely the finalistic explanations so well established by Darwin's epoch-making book. In their place he substitutes mechanistic explanations, and his reasoning has great cogency. The finalistic type of explanation of vital phenomena is very plausible and seizing. We snarl when we are angry because we want to scare our neighbor by showing him we are about to bite; or rather, as we no longer bite, we do it because our ancestors did when they wanted to warn their neighbors to keep to their own tree; and we smile because it is useful to show an opposite state of feeling.

But Janet—and others—find that smiling is the mechanically produced contortion of muscular stimulus due to strong emotional shock or mental agitation, and this mental agitation is not at all necessarily one of joy or friendliness or risibility. We smile often when we want to weep, when we are surprised, when we are embarrassed, when we are terrified. The facial muscles are roughly divisible into two unequal sets; one, above, of more and stronger muscles; the other, below, of fewer and weaker ones. When the stimulus comes the muscular pull of the upper set is stronger and our mouth corners go up and the contortion we call a smile is produced. But various emotions may produce the stimulus. If the contortion, that is the smile, is useful, well and good; but it is not a result of usefulness.

A brick is red because it contains by very virtue of being a brick certain chemical components in physical state, of which an attribute is redness. We ask for no further explanation of the brick's color. But let a butterfly's wing be red, and though the waste uric granules in its cuticular scales be of chemical and physical nature to compel them to absorb other colors and reflect red just as brick stuff does, we demand more explaining. We must have utility in this red; we must have a finalistic explanation, and if this explanation be not readily afforded by Darwinian selection or Lamarckian adaptation we have still left the ever-ready and always sufficient explanation of vitalism. The butterfly's wing is usefully red because the butterfly is alive.

We must admire the durability of the good old inheritance of acquired characters problem, even if its repeated resuscitation is sometimes a little less than interesting to us. However, our lessening of interest in it in no way reflects any lessening of its importance. It is still the *crux* of the whole species-forming problem. Neither mutations-theory nor Mendelism make its solution any less imperatively needed.

A recent important contribution, not of discussion alone but of new facts, to the inheritance of acquired characters problem is that of Jennings, who finds that, contrary to the admission on theoretical basis of even some of the most thoroughgoing anti-Lamarckians, acquired characters are not inherited in the Protozoa; at least in those Protozoa which were the subjects of Jennings's brilliant observation and experimentation. This may be a serious blow to the neo-Lamarckian side of the case—or it may not. It is if the old statement of the problem is to be always adhered to, but for some time now this statement has been recognized to be faulty and outworn. The neo-Lamarckian, taking the aggressive, prefers to put it this way: How are we to explain the fact that heritable differences distinguishing species or constant varieties (elementary species?) are often identical with those differences, uninherited, which can be produced ontogenetically among individuals of a single species of the group by submitting them to varying environmental or nutritional conditions? The fact exists and the presumption that it raises is that these identical species (heritable) differences have had the same ultimate causes which under our very eyes produce the non-heritable differences of the ontogenic varieties.

What is needed is the mechanism of cumulation or conversion of the non-heritable differences into identical heritable ones. This mechanism must, of course, concern itself with reproduction, with the germ-cells; and put as Jennings strongly puts it, it seems at first sight as if it must be an impossibly complex mechanism. But after all it is the change that has to be complex. The mechanism needed is one capable of producing changes of seeming great complexity. But comparatively simple mechanical transformers that produce very complex physiological changes are not unknown in biology, and there may, after all, be one awaiting discovery by Jennings, or some other equally ingenious and persistent student of this good old enduring problem of acquired characters.

V. L. K.

PARIS, March, 1909.

DE VRIES'S SPECIES AND VARIETIES

Species and Varieties.—About two years ago De Vries's "Species and Varieties: their Origin by Mutation" was translated into German. A translation[1] of the same work has now appeared in French and no doubt it will ere long find a place in the literature of a number of other tongues.

As the first book which presented in a popular form the distinction between fluctuations and mutations, the world-wide circulation of this book means much for the advancement of modern biological conceptions. This is particularly true because a just delimitation of these two kinds of variations has been made, and can be made, only through the application of experimental methods. The result of the enlarged circulation of this work must be to stimulate the use of these methods among the biologists of every country in which it is made accessible.

The French edition was translated by Dr. L. Blaringhem, who is already well known because of his numerous studies on variations apparently induced by traumatism. He was a student of the well-known French biologist, the late Professor A. Giard, and to the memory of the latter, the French edition is dedicated. Professor Giard was to have written a preface to this edition, but illness which later resulted in his death rendered this impossible. A very brief prefatory note by the translator and one by the author are the only additions to the text of the English edition.

Already some subjects considered in this book could advangeously receive a somewhat different treatment, but it is perhaps better to allow the book to stand as it was originally written, so to take its position as a classic, retaining a historical value when its current biological value shall have been eclipsed by other works presenting the results of subsequent experimentation. This is evidently the attitude assumed by the author and

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[1] De Vries, H. "Espèces et variétés: leur naissance par Mutation," *Traduit de l'Anglais par L. Blaringhem,* pp. viii + 548, 1909. Paris: Felix Alcan.